Yamaha Extended Control API Specification (Advanced)

Rev. 1.00

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1. Preface

This document describes specifications of API of Yamaha Extended Control (YXC, hereafter) for Yamaha A/V products. YXC is Yamaha's new communication protocol sent over Ethernet and Wi-Fi to control MusicCast enabled devices. This document describes only advanced function (Link etc.). Basic function is described in Yamaha Extended Control API Specification(Basic)..

2. Definitions

- MusicCast
  A function to share music easily among audio devices in multiple rooms at homes
- MusicCast Device(s)
  All products/devices that are equipped with MusicCast functions
- MusicCast Network
  A communication network on which MusicCast Devices join.
  - By multiple MusicCast Devices communicating each other on the same network (=MusicCast Network), all MusicCast devices can be operated using MusicCast App/YXC
- Location
  A unit of MusicCast Network being comprised. Location is expressed as Location ID made up by 32 characters
  - Max number of MusicCast Devices within 1 Location is up to 10
- Link
  A function to share an audio stream among rooms
- Link Master Room
  A master room an audio distribution comes from
- Link Client Room(s)
  Client room(s) a music track to be distributed from Link Master Room
- Linked Rooms
  All rooms being linked including master and clients, or a Group
- Linked Room
  A room of linked client room(s)
- Group
  All lined rooms including master and clients, or Linked Rooms
- Device
  Equal to MusicCast Device
- Room
  A minimum component MusicCast devices can be shown/associated within a MusicCast network
- Main Zone Sync
  A function to input the same source as Main Zone to Zone 2/3.

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3. API Overview

- Request Parameters
  Parameter information to inquire. Parameters stated as "required = yes" have always to be specified as one of inquiring parameters, while parameters marked as "required = no" can be omitted or need to be used in special cases
- Response Parameters
  Parameter information to be returned in the body of response (in JSON object format). Not all parameters listed here are always to be returned in a response, depending on each device specs/functions/setup situations. “response_code” is always returned
  - Note: JSON format data expressions in this document get well formatted for readability, but actual data don’t include spaces, intends and carriage return/line feeds
- Base URL
  "<BaseURL>" shown in URI is http://{host}/YamahaExtendedControl
  - {host} is an IP address of a Device to get controlled
- API version
  Values like “v1” or “v2” specified in URI shows a corresponding API version number. Backward compatibility of APIs always being assured unless specified, all APIs that have equal to or smaller API version number(s) that can be read via “getDeviceInfo” are supported on a Device
- Data size of a sting
  In case a string is specified with its data size, it is a size before JSON escape process

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4. Zone

4.1. setLinkControl

For setting Link Control in each Zone.

Request Parameters

name	type	required	description
zone	string	yes	Specifies target zone. Available for zones with this function Values: "main" / "zone2" / "zone3" / "zone4"
control	string	yes	Specifies Link Control setting Values: Values gotten via /system/getFeatures

URI	<BaseURL>/v1/<zone>/setLinkControl?control=<control>
Method	GET
Example Request	http://{host}/YamahaExtendedControl/v1/main/setLinkControl?control=normal

Response Parameters

name	type	description
response_code	integer	0: Successful request / Others: Error Refer to "Response Code List" for details

Example Response	{
	"response_code":0
	}

4.2. setLinkAudioDelay

For setting Link Audio Delay in each Zone. This setting is invalid when Link Control setting is " Stability Boost ".

Request Parameters

name	type	required	description
zone	string	yes	Specifies target zone. Available for zones with this function Values: "main" / "zone2" / "zone3" / "zone4"
delay	string	yes	Specifies Link Audio Delay setting Values: Values gotten via /system/getFeatures

URI	<BaseURL>/v1/<zone>/setLinkAudioDelay?delay=<delay>
Method	GET
Example Request	http://{host}/YamahaExtendedControl/v1/main/setLinkAudioDelay?delay=lip_sync

Response Parameters

name	type	description
response_code	integer	0: Successful request / Others: Error Refer to "Response Code List" for details

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Example Response	{
	"response_code":0
	}

5. Distribution (Link)

APIs in regard to Link distribution related setting and getting information

5.1. getDistributionInfo

For retrieving a Device information related to Link distribution

Request Parameters

URI	<BaseURL>/v1/dist/getDistributionInfo
Method	GET
Example Request	http://{host}/YamahaExtendedControl/v1/dist/getDistributionInfo

Response Parameters

name	type	Description
response_code	integer	0: Successful request / Others: Error Refer to "Response Code List" for details
group_id	string	Returns Group ID in 32-digit hex
group_name	string	Returns Group Name
role	string	Returns a role of Link distribution Values: "server" / "client" / "none"
server_zone	string	Returns target Zone ID that can work as a client of distributing server. If there's no parameter of this, "main" is implicitly chosen. Values: "main" / "zone2" / "zone3" / "zone4"
client_list	array	Returns registered client IP address list Valid only when the role is "server"
|- ip_address	string	Returns clients' IP Address
|- data_type	string	Returns a type of distributed data Values: "base" / "ext"

Example Response	{ "response_code":0, "group_id":"9A237BF5AB80ED3C7251DFF49825CA42", "group_name":"[Link] Living Room", "role":"server", "server_zone":"main", "client_list":[{ "ip_address":"192.168.0.5", "data_type":"base" }, { "ip_address":"192.168.0.11",

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	"data_type":"base"
	},
	{
	"ip_address":"192.168.0.22,
	"data_type":"ext"
	}
	]
	}

5.2. setServerInfo

For setting a Link distribution server (Link master)

Request Parameters

Name	type	required	description
group_id	string	yes	Specify Group ID in 32-digit hex. Specify "" (empty text) here to cancel a Device being the Link distribution server. Group ID will be initialized ("000...") after the cancel operation
Zone	string	no	Specifies which target Zone ID to be the Link distribution server. If nothing is specified, current setting is kept. Zone ID to be the Link distribution server is confirmable using system/getFeatures server_zone_list. Values: "main" / "zone2" / "zone3" / "zone4"
Type	string	no	Specifies a type of adding or removing clients. Not necessary to specify when canceling the Link master status, Values: "add" / "remove"
client_list	string array	no	Specifies IP addresses of adding/removing clients. Specifiable up to 9 clients

URI	<BaseURL>/v1/dist/setServerInfo
Method	POST
Example Request (URI)	http://{host}/YamahaExtendedControl/v1/dist/setServerInfo

Example Request (json)	{
	"group_id":"9A237BF5AB80ED3C7251DFF49825CA42",
	"zone":"main",
	"type":"add",
	"client_list":[
	"192.168.0.5",
	"192.168.0.11"
	]
	}

Response Parameters

name	type	description
response_code	integer	0: Successful request / Others: Error Refer to "Response Code List" for details

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Example Response	{
	"response_code":0
	}

5.3. setClientInfo

For setting Link distributed clients. If a Device is already setup as Link distribution server, this client setup is denied by that Device: use this API after canceling a Device's Link distribution server setup using setServerInfo, then confirming that the target Device's role is changed to other values than "server" using getDistributionInfo.

Request Parameters

name	type	required	description
group_id	string	yes	Specifies Group ID in 32-digit hex. Specify "" (empty text) here to cancel a Device being a Link distributed client. Group ID will be initialized ("000...") after the cancel operation
zone	string array	no	Specifies which target Zone ID to be a Link distributed client. Not necessary to specify when cancelling a client status. Values: "main" / "zone2" / "zone3" / "zone4"
server_ip_address	string	no	Specifies the IP Address of the Link distribution server

URI	<BaseURL>/v1/dist/setClientInfo
Method	POST
Example Request (URI)	http://{host}/YamahaExtendedControl/v1/dist/setClientInfo

Example Request (json)	{
	"group_id":"9A237BF5AB80ED3C7251DFF49825CA42",
	"zone":[
	"main",
	"zone2"
	]
	}

Response Parameters

name	type	description
response_code	integer	0: Successful request / Others: Error Refer to "Response Code List" for details

Example Response	{
	"response_code":0
	}

5.4. startDistribution

For initiating Link distribution. This is valid to a Device that is setup as Link distribution server.

Request Parameters

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name	type	required	description
num	integer	yes	Specifies Link distribution number on current MusicCast Network

URI	<BaseURL>/v1/dist/startDistribution?num=<num>
Method	GET
Example Request	http://{host}/YamahaExtendedControl/v1/dist/startDistribution?num=2

Response Parameters

name	type	description
response_code	integer	0: Successful request / Others: Error Refer to "Response Code List" for details

Example Response	{
	"response_code":0
	}

5.5. stopDistribution

For quitting Link distribution. This is valid to a Device that is setup as Link distribution server.

Request Parameters

URI	<BaseURL>/v1/dist/stopDistribution
Method	GET
Example Request	http://{host}/YamahaExtendedControl/v1/dist/stopDistribution

Response Parameters

name	type	description
response_code	integer	0: Successful request / Others: Error Refer to "Response Code List" for details

Example Response	{
	"response_code":0
	}

5.6. setGroupName

For setting up Group Name. Note that Group Name is reserved in volatile memory

Request Parameters

name	type	required	description
name	string	yes	Specifies Group Name. Use UTF-8 within 128 bytes. Default name would be used if it's not setup or "" (empty text) is specified

URI	<BaseURL>/v1/dist/setGroupName
Method	POST
Example Request (URI)	http://{host}/YamahaExtendedControl/v1/dist/setGroupName
Example Request	{

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(json)	"name":"[Link] Living Room" }

Response Parameters

name	type	description
response_code	integer	0: Successful request / Others: Error Refer to "Response Code List" for details

Example Response	{
	"response_code":0
	}

6. Response Code List

In a response contains one of Response Codes listed below. No other data is included to a response if its response code was other than '0' (Successful request)

code	description
0	Successful request
1	Initializing
2	Internal Error
3	Invalid Request (A method did not exist, a method wasn't appropriate etc.)
4	Invalid Parameter (Out of range, invalid characters etc.)
5	Guarded (Unable to setup in current status etc.)
6	Time Out
99	Firmware Updating
	(100s are Streaming Service related errors)
100	Access Error
101	Other Errors
102	Wrong User Name
103	Wrong Password
104	Account Expired
105	Account Disconnected/Gone Off/Shut Down
106	Account Number Reached to the Limit
107	Server Maintenance
108	Invalid Account
109	License Error
110	Read Only Mode
111	Max Stations
112	Access Denied

7. All ID List

Type	ID
Zone	main / zone2 / zone3 / zone4

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	※Zone A is handles as "main", Zone B is handles as "zone2"
Input	cd / tuner / multi_ch / phono / hdmi1 / hdmi2 / hdmi3 / hdmi4 / hdmi5 / hdmi6 / hdmi7 / hdmi8 / hdmi / av1 / av2 / av3 / av4 / av5 / av6 / av7 / v_aux / aux1 / aux2 / aux / audio1 / audio2 / audio3 / audio4 / audio_cd / audio / optical1 / optical2 / optical / coaxial1 / coaxial2 / coaxial / digital1 / digital2 / digital / line1 / line2 / line3 / line_cd / analog / tv / bd_dvd / usb_dac / usb / bluetooth / server / net_radio / rhapsody / napster / pandora / siriusxm / spotify / juke / airplay / radiko / qobuz / mc_link / main_sync / none
Sound Program	munich_a / munich_b / munich / frankfurt / stuttgart / vienna / amsterdam / usa_a / usa_b / tokyo / freiburg / royaumont / chamber / concert / village_gate / village_vanguard / warehouse_loft / cellar_club / jazz_club / roxy_theatre / bottom_line / arena / sports / action_game / roleplaying_game / game / music_video / music / recital_opera / pavilion / disco / standard / spectacle / sci-fi / adventure / drama / talk_show / tv_program / mono_movie / movie / enhanced / 2ch_stereo / 5ch_stereo / 7ch_stereo / 9ch_stereo / 11ch_stereo / stereo / surr_decoder / my_surround / target / straight / off

Note: Rhapsody service name will be changed to Napster. Accordingly, rhapsody input ID is changed to napster input ID.

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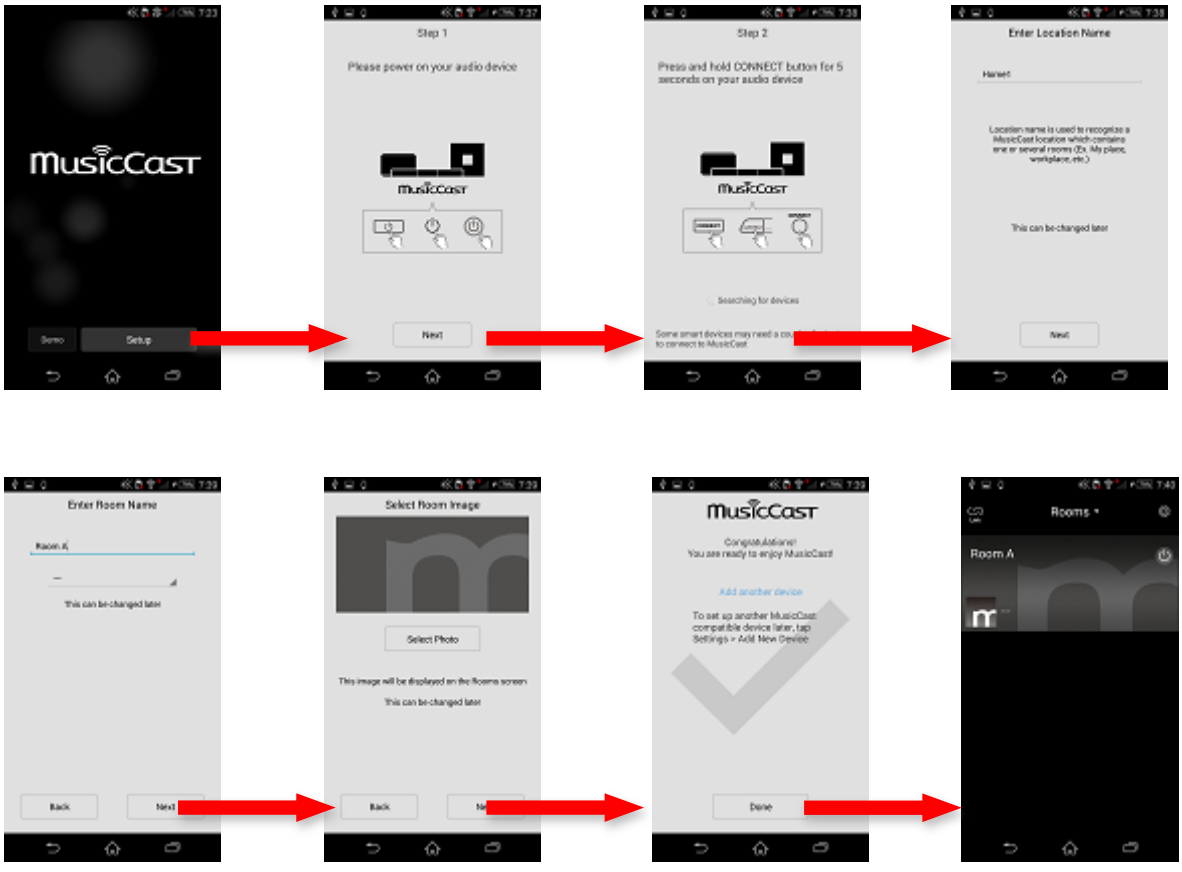
8. MusicCast Network Initial Setup

Initial Setup means to let a MusicCast Device join to MusicCast Network. It can be done only though MusicCast CONTROLLER app. To do so, download and install the free app of MusicCast CONTROLLER to mobile devices (smart phones, tablets)

- AppStore
  (US)
  https://itunes.apple.com/us/app/musiccast-controller-us/id1002730190
  (Outside US)
  https://itunes.apple.com/jp/app/musiccast-controller/id1012248381

  GooglePlay
  https://play.google.com/store/apps/details?id=com.yamaha.av.musiccastcontroller

1. Launch the app
   Choose “Setup” when it’s launched. When you setup 2nd or more MusicCast devices, choose “Add New Device” in the setup menu of the app.
2. Turn on the power of MusicCast Device being setup.
3. Press and hold “CONNECT” button on a MusicCast Device for more than 5 seconds
4. Choose or type in Location Name
5. Choose or type in Room Name
6. Choose a Room Image



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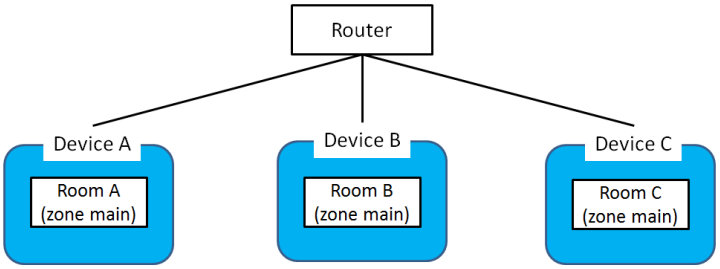
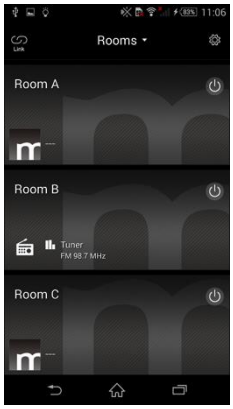
9. Application Notes

9.1. Link Function

Here explains how to use MusicCast Link function with YXC commands.

Assume that MusicCast Network initial setup is already done and MusicCast Network is established as following.





9.1.1. Making a Group

Here shows how to make a Group. This is trying to establish a distribution network with Device B being a master, and with Device A and Device C being clients.

1. Create a random Group ID (16 byte).
2. Setup all clients with the Group ID and target Zone being used by “setClientInfo”.

Request (URI)

http://{Device A}/ YamahaExtendedControl/v1/dist/setClientInfo

Request (json)

```
{
        "group_id":"9A237BF5AB80ED3C7251DFF49825CA42",
        "zone":[
            "main"
        ]
}
```

Response

```
{
        "response_code":0
}
```

Request (URI)

http://{Device C}/ YamahaExtendedControl/v1/dist/setClientInfo

Request (json)

```
{
        "group_id":"9A237BF5AB80ED3C7251DFF49825CA42",
        "zone":[
            "main"
```

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```
        ]
}
```

Response

```
{
        "response_code":0
}
```

3. Setup the master with GroupID and client list by “setServerInfo (add)”.

Request (URI)

http://{Device B}/ YamahaExtendedControl/v1/dist/setServerInfo

Request (json)

```
{
        "group_id":"9A237BF5AB80ED3C7251DFF49825CA42",
        "zone":"main",
        "type":"add",
        "client_list":[
            "192.168.0.5",
            "192.168.0.6"
        ]
}
```

Device A IP address

Device C IP address

Response

```
{
        "response_code":0
}
```

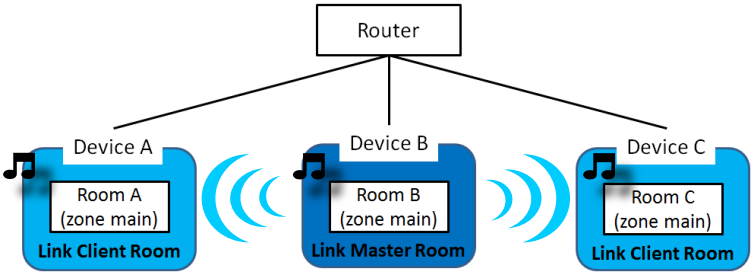
4. Start distribution with setting current all system distribution number to the master by “startDistribution”.

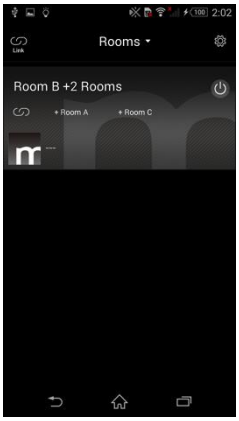
Request (URI)

http://{Device B}/ YamahaExtendedControl/v1/dist/startDistribution?num=0

Response

```
{
        "response_code":0
}
```





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9.1.2. Removing a client from the Group

Here shows how to remove DeviceC from the Group

1. Clear GourpID and target Zone of the removing client(s) by “setClientInfo”.
   *Set Group ID with empty text ””.
   Request (URI)
   http://{Device C}/ YamahaExtendedControl/v1/dist/setClientInfo

   Request (json)
   ```
   {
           "group_id":"",
           "zone":[
               "main"
           ]
   }
   ```
   Response
   ```
   {
           "response_code":0
   }
   ```

2. Setup the master with GroupID and removing client list by “setServerInfo (remove)”.
   *If all clients are to be remove, set empty text ”” to GroupID in setServerInfo
   Request (URI)
   http://{Device B}/ YamahaExtendedControl/v1/dist/setServerInfo

   Request (json)
   ```
   {
           "group_id":"9A237BF5AB80ED3C7251DFF49825CA42",
           "zone":"main",
           "type":"remove",
           "client_list":[
               "192.168.0.6"
           ]
   }
   ```
   Device C IP address
   Response
   ```
   {
           "response_code":0
   }
   ```

3. Reflect current all system distribution number to the master by “startDistribution”.
   Request (URI)
   http://{Device B}/ YamahaExtendedControl/v1/dist/startDistribution?num=2

   Response
   ```
   {
           "response_code":0
   }
   ```

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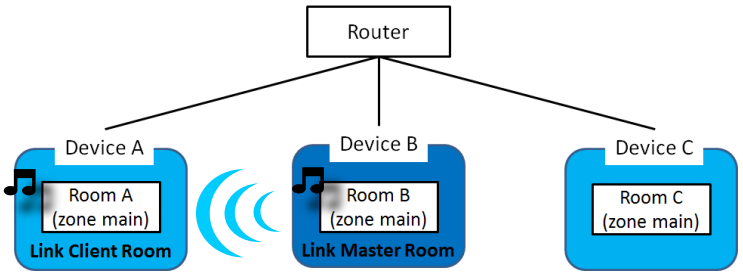

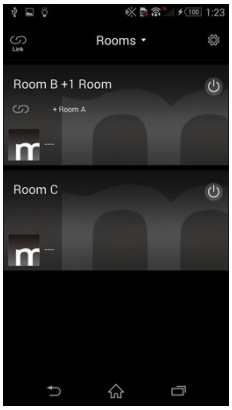

9.1.3. Adding a client to the Group

Here shows how to add DeviceC to the Group.

1. Setup GourpID and target Zone of the adding client(s) by “setClientInfo”.

Request (URI)

http://{Device C}/ YamahaExtendedControl/v1/dist/setClientInfo

Request (json)

```
{
        "group_id":"9A237BF5AB80ED3C7251DFF49825CA42",
        "zone":[
            "main"
        ]
}
```

Response

```
{
        "response_code":0
}
```

2. Setup the master with GroupID and adding client list by “setServerInfo (add)”.

Request (URI)

http://{Device B}/ YamahaExtendedControl/v1/dist/setServerInfo

Request (json)

```
{
        "group_id":"9A237BF5AB80ED3C7251DFF49825CA42",
        "zone":"main",
        "type":"add",
        "client_list":[
            "192.168.0.6"
        ]
}
```

← Device C IP address

Response

```
{
        "response_code":0
}
```

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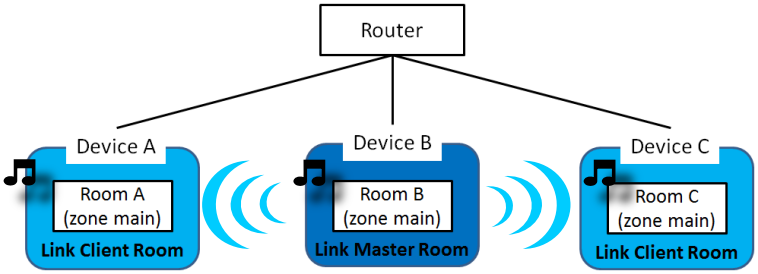
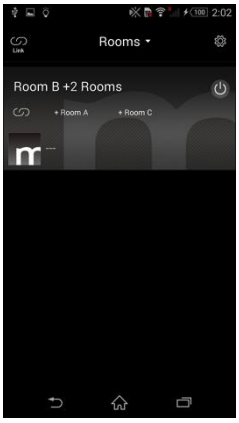
3. Reflect all system distribution number to the master by “startDistribution”.
   Request (URI)
   http://{Device B}/ YamahaExtendedControl/v1/dist/startDistribution?num=1

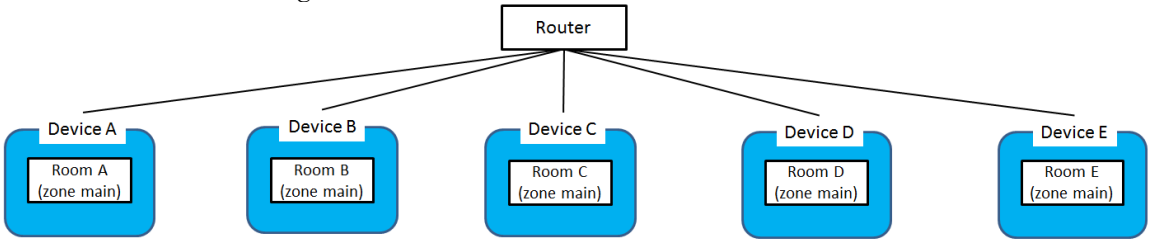
   Response
   {
   "response_code":0
   }



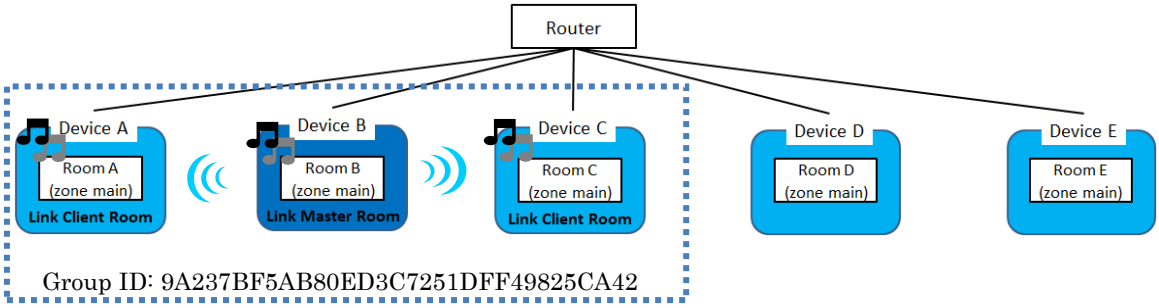


9.1.4. Making multi Groups

Here shows how to make multi Groups.
Assume that MusicCast Network initial setup is already done and MusicCast Network is established as following.



Follow 13.2.1(Making a Group), establish a distribution network with Device B being a master, and with Device A and Device C being clients.



Next is trying to establish a distribution network with Device D being a master, and with Device E being clients.

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1. Create a random Group ID (16 byte).
   ＊Note not set the same Group ID

2. Setup all clients with the Group ID and target Zone being used by “setClientInfo”.

   Request (URI)
   http://{Device E}/ YamahaExtendedControl/v1/dist/setClientInfo

   Request (json)
   ```
   {
           "group_id":"7B335AE4C12345677251DAA466669B40",
           "zone":[
               "main"
           ]
   }
   ```
   Response
   ```
   {
           "response_code":0
   }
   ```

3. Setup the master with GroupID and client list by “setServerInfo (add)”.

   Request (URI)
   http://{Device D}/ YamahaExtendedControl/v1/dist/setServerInfo

   Request (json)
   ```
   {
           "group_id":"7B335AE4C12345677251DAA466669B40",
           "zone":"main",
           "type":"add",
           "client_list":[
               "192.168.0.8"
           ]
   }
   ```


   Response
   ```
   {
           "response_code":0
   }
   ```

4. Start distribution with setting current all system distribution number to the master by “startDistribution”.Already establish a distribution network with Device B being a master, and with Device A and Device C being clients, need to set num = 2.

   Request (URI)
   http://{Device B}/ YamahaExtendedControl/v1/dist/startDistribution?num=2

   Response
   ```
   {
           "response_code":0
   ```

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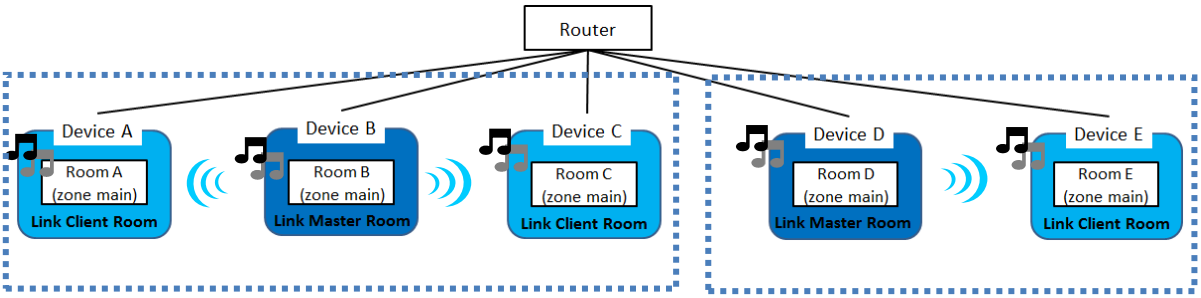
}



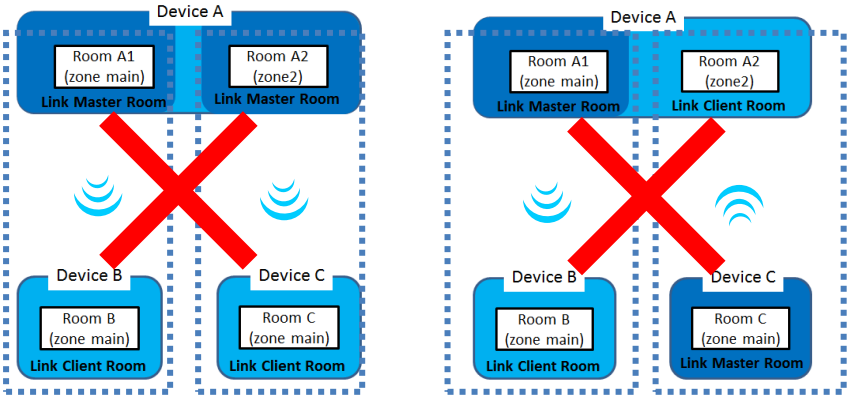
9.1.5. External causes/interruptions making a break of a Group

If things shown below happen, it is necessary for a Group to be properly handled as mentioned below (mostly by removing client(s) from the master. Refer to 13.2.2, procedure #2);

1. In case a Device's input is selected to others than MusicCast Link
   - If a Device is the master, nothing matters
   - If a Deice is a client, it needs to be removed from the Group, meaning:
     - Remove the client from the master
     - Clear the Group ID in the client
2. In case a Device is assigned to the other Group for some reason
   - If a Device is the master, all client(s) assigned to it need to be removed from the Group
   - If a Device is a client, it needs to be removed from the master

9.1.6. Note to making Group

1. In case of Multi Zone Receiver, each Zone unable to join discrete separate groups.



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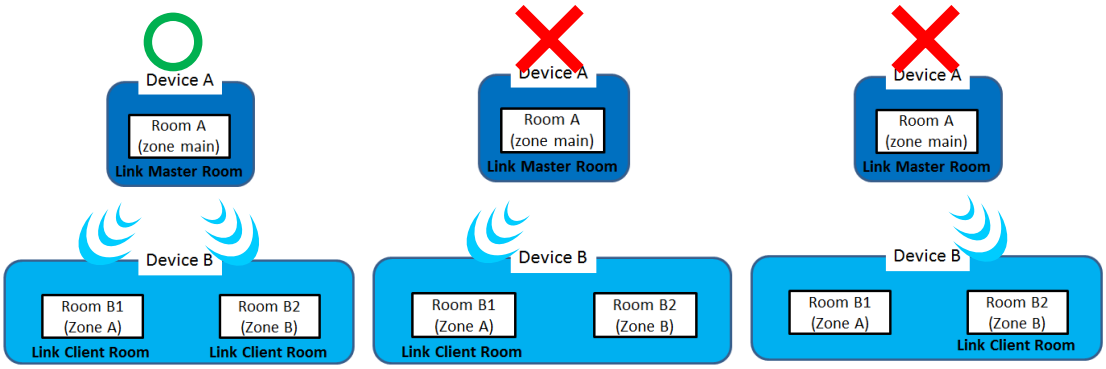
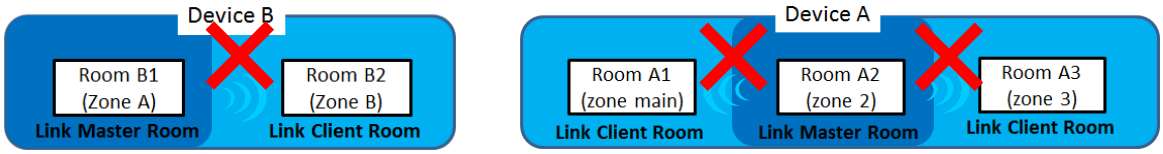
2. Zone A or B but not both is not being the Client.



3. Each Zone unable to be set Master and Client in same group.



Available to make pseudo-Group that Main Zone is Master and Zone2 or Zone3 equipped Main Zone Sync feature is Client. In this case, no network distribution among Master and Client.

4. Group can be made between devices have different Location ID. Max number of MusicCast Devices within 1 Group is up to 10.

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Revision History

Rev.	Date	Contents	Author
1.00	9/28/2016	First edition	Eto

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